

## **Removal of North Lake Belt Storage. DRAFT (9/11/98)**

### **Description of Simulation**

Simulation (run) is based on ALTD13R with North Lake Belt storage and its functions (Component XX) completely removed. This scenario run is identified as NONLKB in the attached graphics. In ALTD13R the North Lake Belt Storage area covers 4,500 acres with a maximum storage depth of 20 feet. The storage area is filled with excess water from western C-11, C-9 and C-6 basins. In general, the North Lake Belt Storage provides water to maintain C-2, C-4, C-6 and C-9 and to increase canal discharges to Central Biscayne Bay.

### **Assumptions**

- Perimeter seepage barrier is completely removed (Fig.1).
- Excess water that is diverted into North Lake Belt storage from C-9 and C-6 in ALTD13R is allowed to go to tide.
- Excess water that is diverted into North Lake Belt storage in ALTD13R from Western C-11 Basin via proposed canal along US 27 (US27S canal in the model) is routed through S-9 into WCA-3A if US27S canal stage is sufficiently high. As in ALTD13R, the outflow from C-11 reservoir is routed directly into US27S canal.

### **Summary of Results**

The removal of North Lake Belt storage results in the following:

- Significant increase in the dependence on the regional system (Lake Okeechobee and WCA-3A) for water supply to LECSA3 . Figure 2 shows an increase from an average of 41 kac-ft per year over the simulation period in ALTD13R to 95 kac-ft per year with North Lake Belt removed. Note from Figure 2 that the remaining 19 kaf/yr supplied to SA3 from a reservoir represents the supply from the Bird Drive Reservoir component. The increase in LOK releases is 24 kac-ft on an annual average basis. As a consequence, the stages in Lake Okeechobee decrease slightly during dry periods (up to 0.3 ft.), as shown in the stage duration curve of LOK stages (ALTD13R and NONLKB in Figure 3). One more undesirable, low Lake stage event occurred (Figure 4).
- Increase in total number of Phase 1 cutback months (from 20 to 39) in service area 2. Figure 5 shows an increase of eight (from 5 to 13) locally triggered cutback months and an increase of one (from 5 to 6) LOK stage induced cutback month in service area 2. The other LEC service areas experienced only an increase of one LOK stage induced cutback month.
- The increase in locally triggered cutbacks is due to the inability to maintain canal stages. Minimum stages in C-9, C-6, and C-4, i.e. canals supplied by the North Lake Belt storage reservoir in ALTD13R are maintained only 90-95% of the time as opposed to nearly 100% of the time in ALTD13R (See Figures 6 through 8).
- Slight increase in demand not met (<1%) in LOK service area due to the increased dependence on LOK for water supply to service area 3 (Figure 9).

- A redistribution of surface water flows to Biscayne Bay. Table 1, which is a supplement to Figure 10, gives the seasonal breakdown of outflows to Biscayne Bay affected by the removal of North Lake Belt Storage. An average of 200 kac-ft/year of surface water flowed into Central Biscayne Bay in ALTD13R, of which 103 kac-ft/year was provided by North Lake Belt Storage. Note that North Lake Belt Storage contributed 90% of the surface water flow in the dry season (54 kac-ft/year out of 61 kac-ft/year). Thus, the seasonal distribution of flow into Central Biscayne Bay is less desirable with North Lake Belt Storage removed: 30% dry, 70% wet in ALTD13R; 25% dry, 75% wet with Lake Belt removed; target is 33% dry, 67% wet. The removal of Lake Belt Storage decreased the total surface water flows into Central Biscayne Bay from 200 kac-ft/year to 138 kac-ft/year while the removal increased the total surface water flows into Miami River North S-26 and Snake Creek Estuary through S-29 from 165 kac-ft/year to 221 kac-ft/year. This redistribution of outflow resulted in a 6 kac-ft/year decrease in outflow to Biscayne Bay with North Lake Belt Storage removed. Seasonally the outflow decreased 10 kac-ft/year in dry season and increased 4 kac-ft/year in wet season as seen in Table 1.

Table 1. Seasonal Breakdown of Outflows to Biscayne Bay Affected By Removal of North Lake Belt (1,000 acre-feet)

	Wet Season		Dry Season	
	ALTD13R	NONLKBLT	ALTD13R	NONLKBLT
Central Bay (Total/Contribution from NLKBLT)	139/49	104/0	61/54	34/0
Miami River (S-26)	42	52	18	23
Snake Creek (S-29)	79	108	26	38
TOTAL	260	264	105	95

**Fig. 1 Sensitivity to Removal of North Lake Belt Storage Area from Alt D13R**

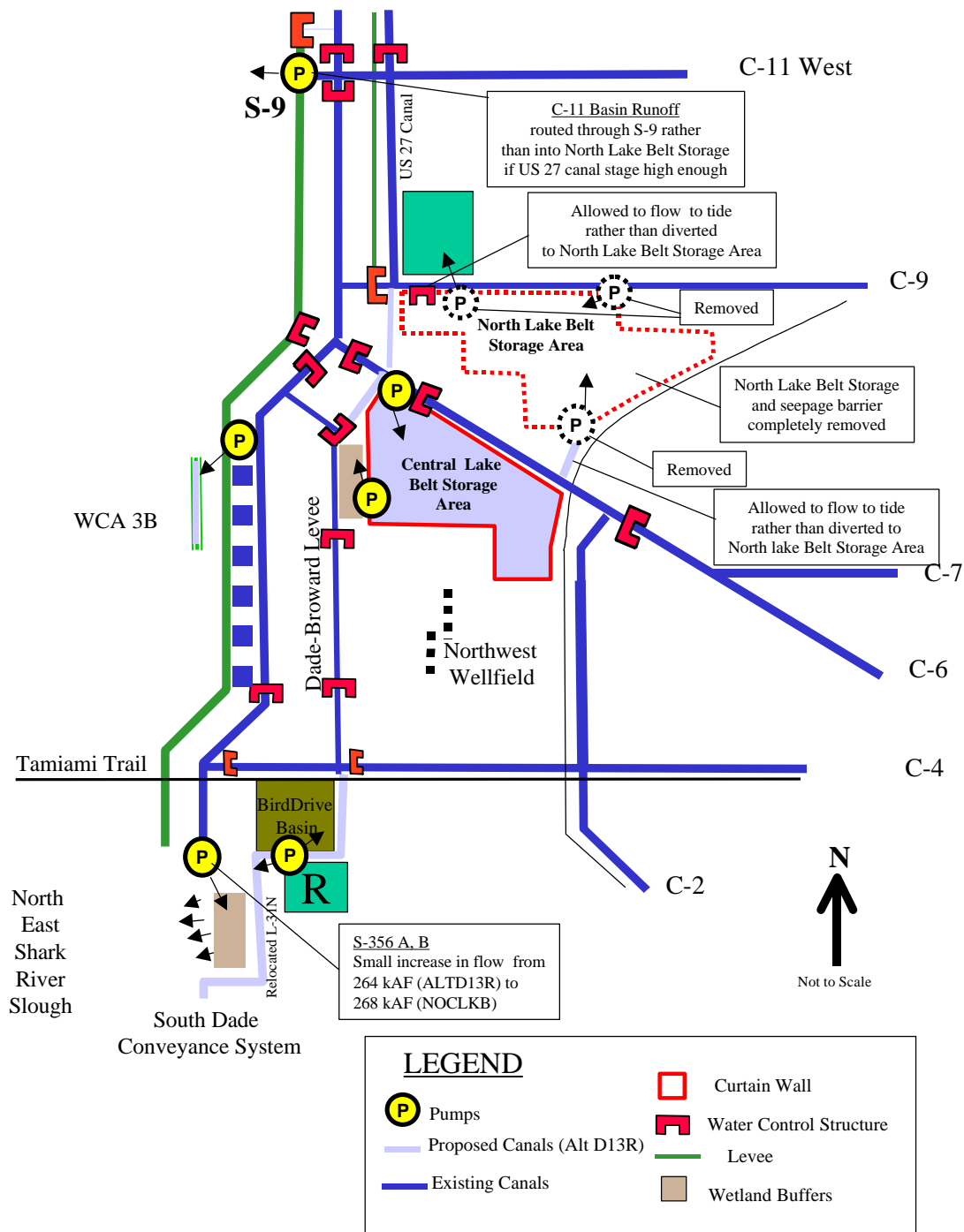
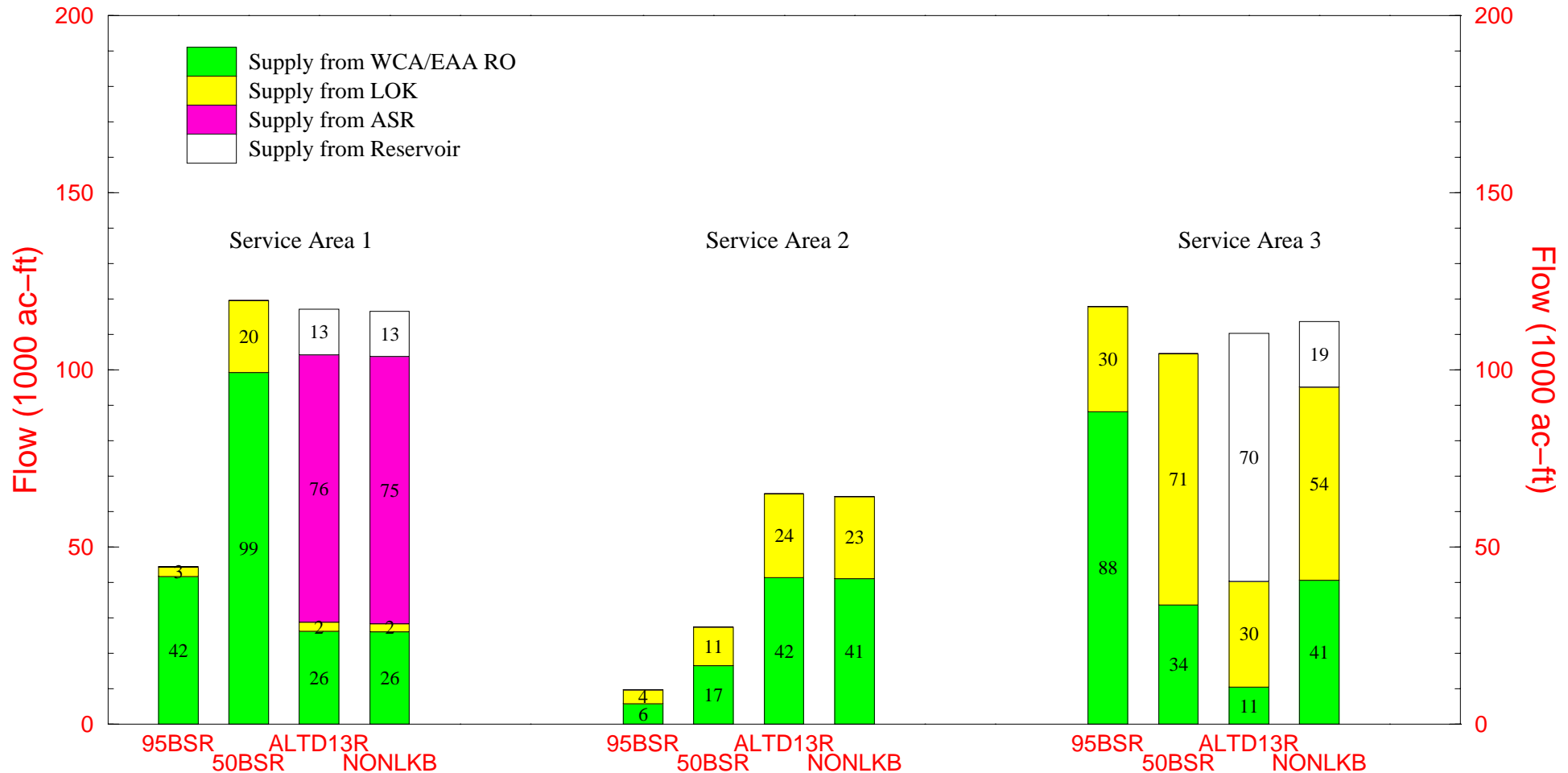


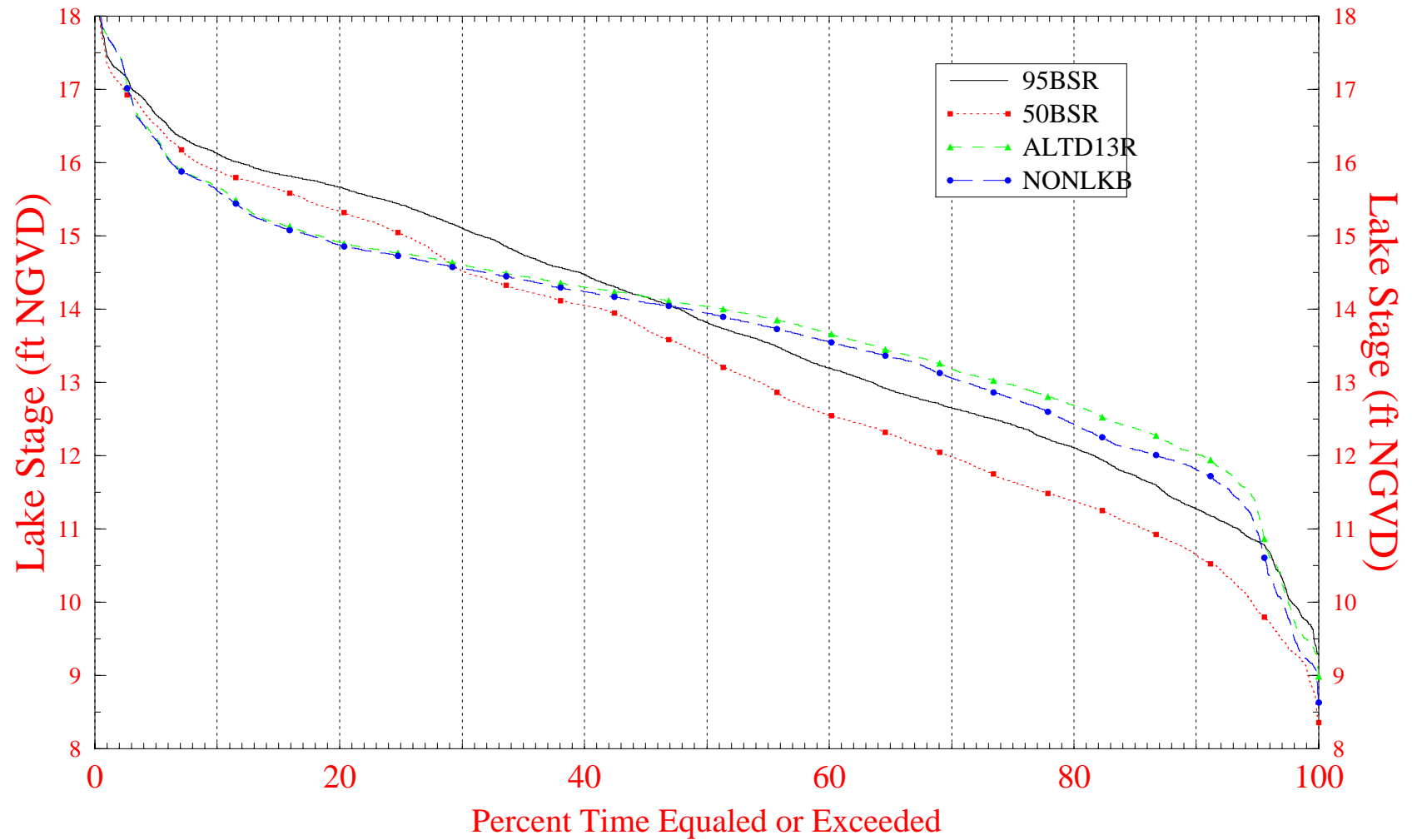
Fig. 2 Average Annual Regional System Water Supply Deliveries to LEC Service Areas for the 1965 – 1995 simulation



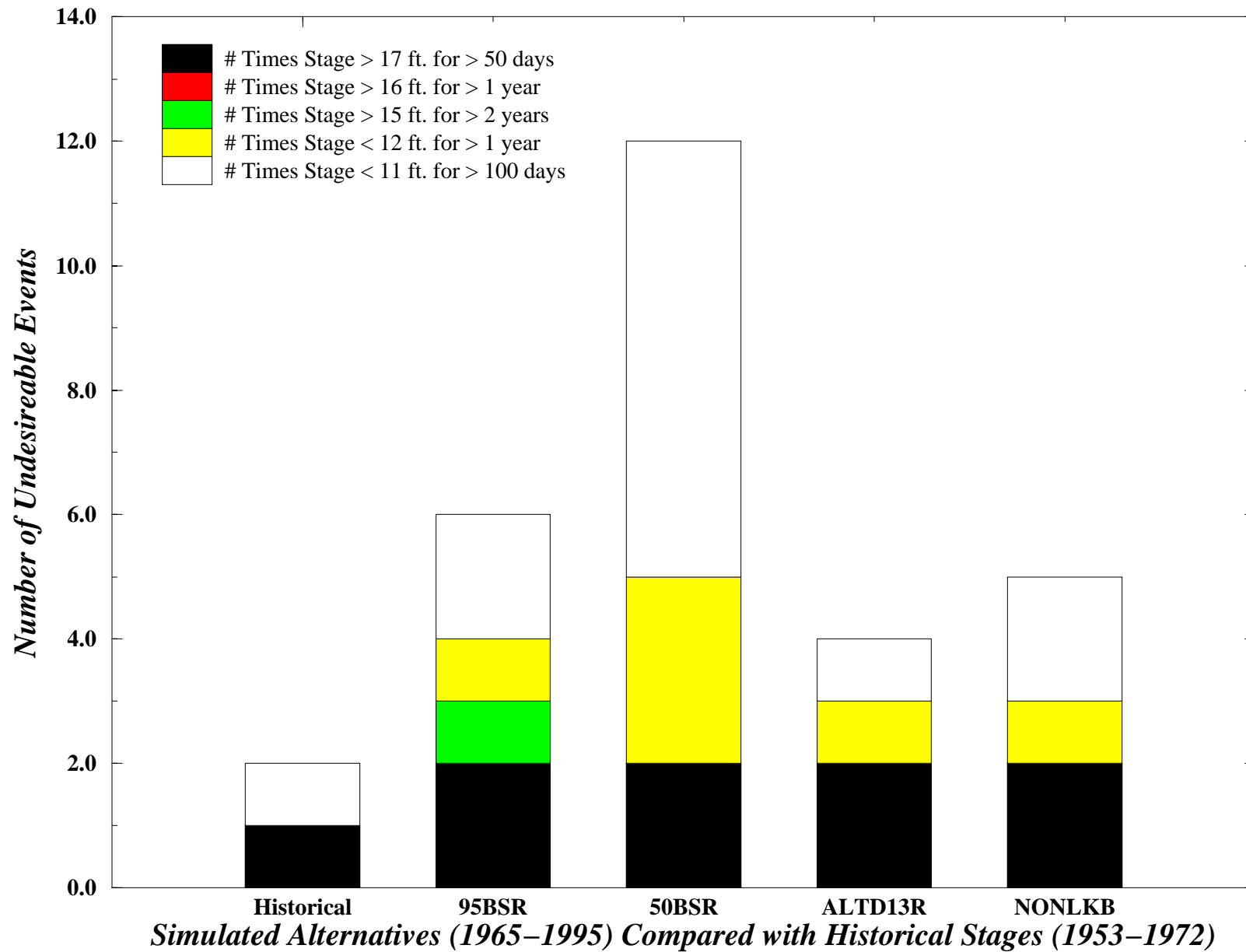
Note: Structure flows included: SA1=S39+LWDD+ADDSLW+ACMEWS+WSL8S+HLFASR+C51FAS+WSC1+S1ATHL+CPBRWS+BPRL8S  
 SA2=S38+S34+NNRFAS; SA3=S31+S334+S337+BRDRWS+LBTC6+LBTDDBL+LBTL30+LBTSC+LBTC9+LBTC2+C9RWS  
 Supply RECEIVED from LOK may be less than what is DELIVERED at LOK due to conveyance constraints.  
 Regional System is comprised of LOK and WCAs.

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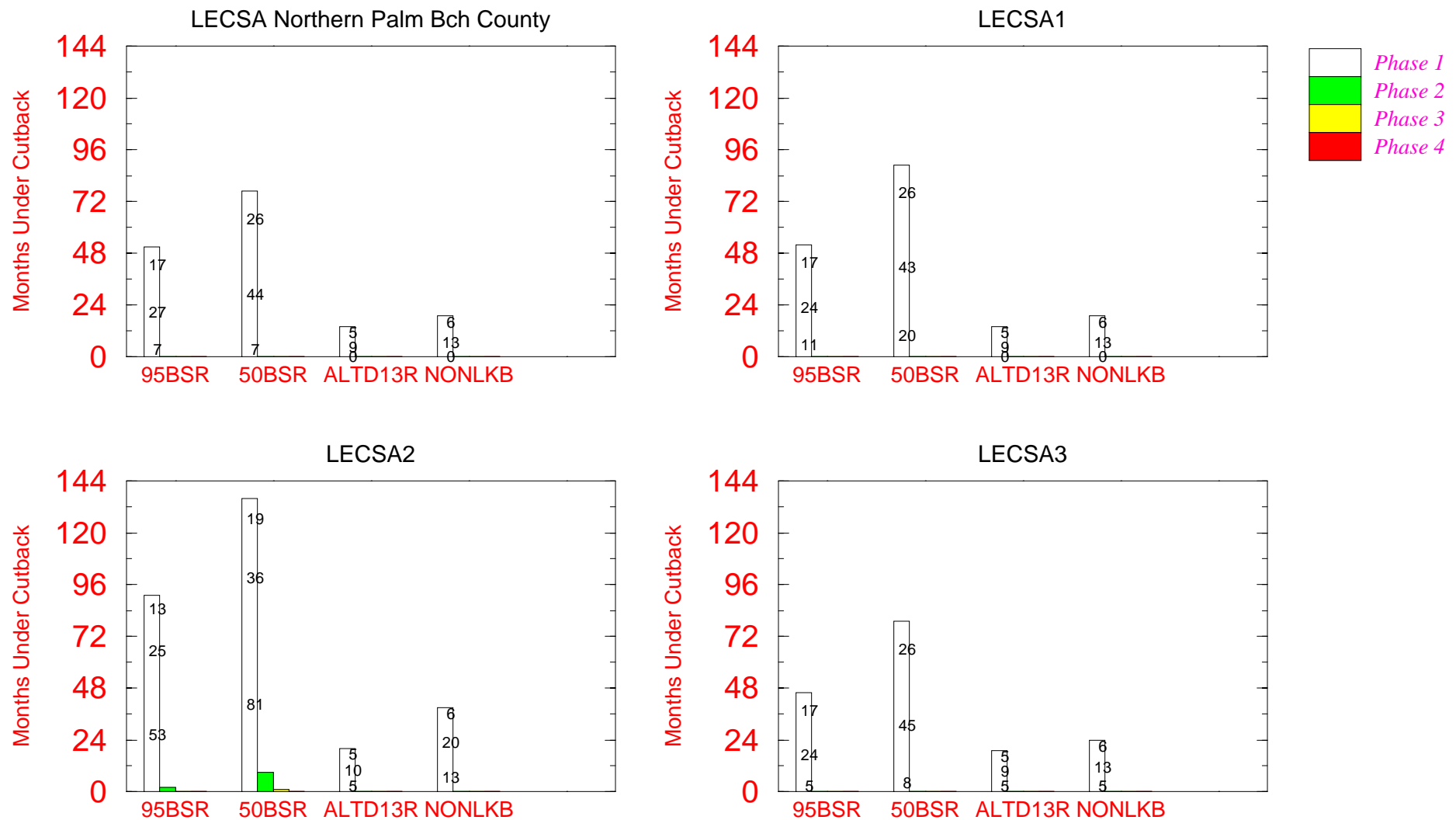
Fig. 3 Lake Okeechobee Stage Duration Curves



**Fig. 4 Number of Undesireable Lake Okeechobee Stage Events**



# Fig. 5 Number of Months of Simulated Water Supply Cutbacks for the 1965 – 1995 Simulation Period



Note: Phase 1 water restrictions could be induced by a) Lake stage in Supply Side Management Zone (indicated by upper data label),  
b) Local Trigger well stages (lower data label), and c) Dry season criteria (indicated by middle data label).

Fig. 6 % of Time Canal Stage < Salt-Water Intrusion Criteria and Occurences > 1 Week  
Canal C-9 at S-29 (Salt-Water Intrusion Indicator Stg = 2.0 ft, NGVD)

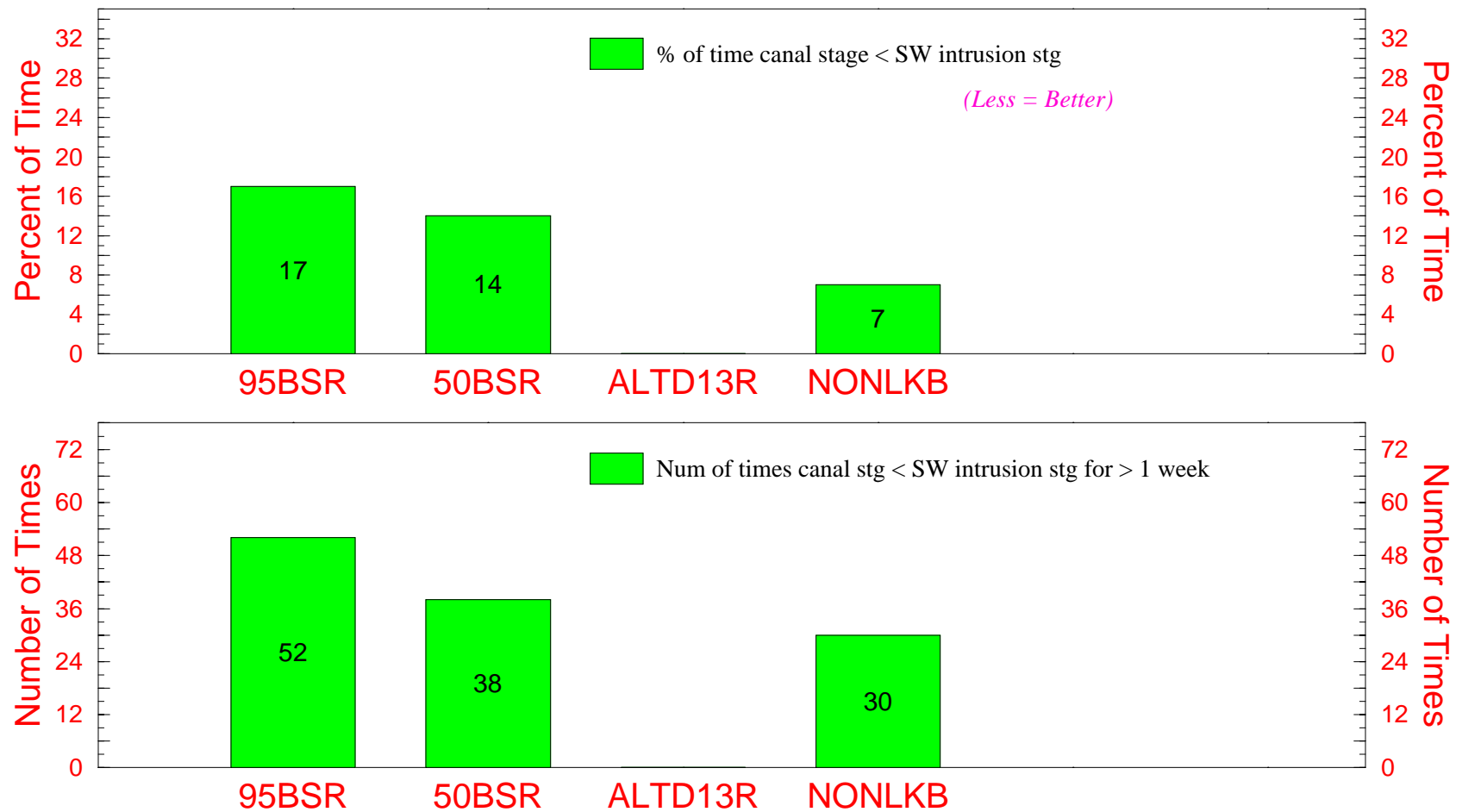




Fig. 7 % of Time Canal Stage < Salt-Water Intrusion Criteria and Occurences > 1 Week  
Canal C-6 at S-26 (Salt-Water Intrusion Indicator Stg = 2.5 ft, NGVD)

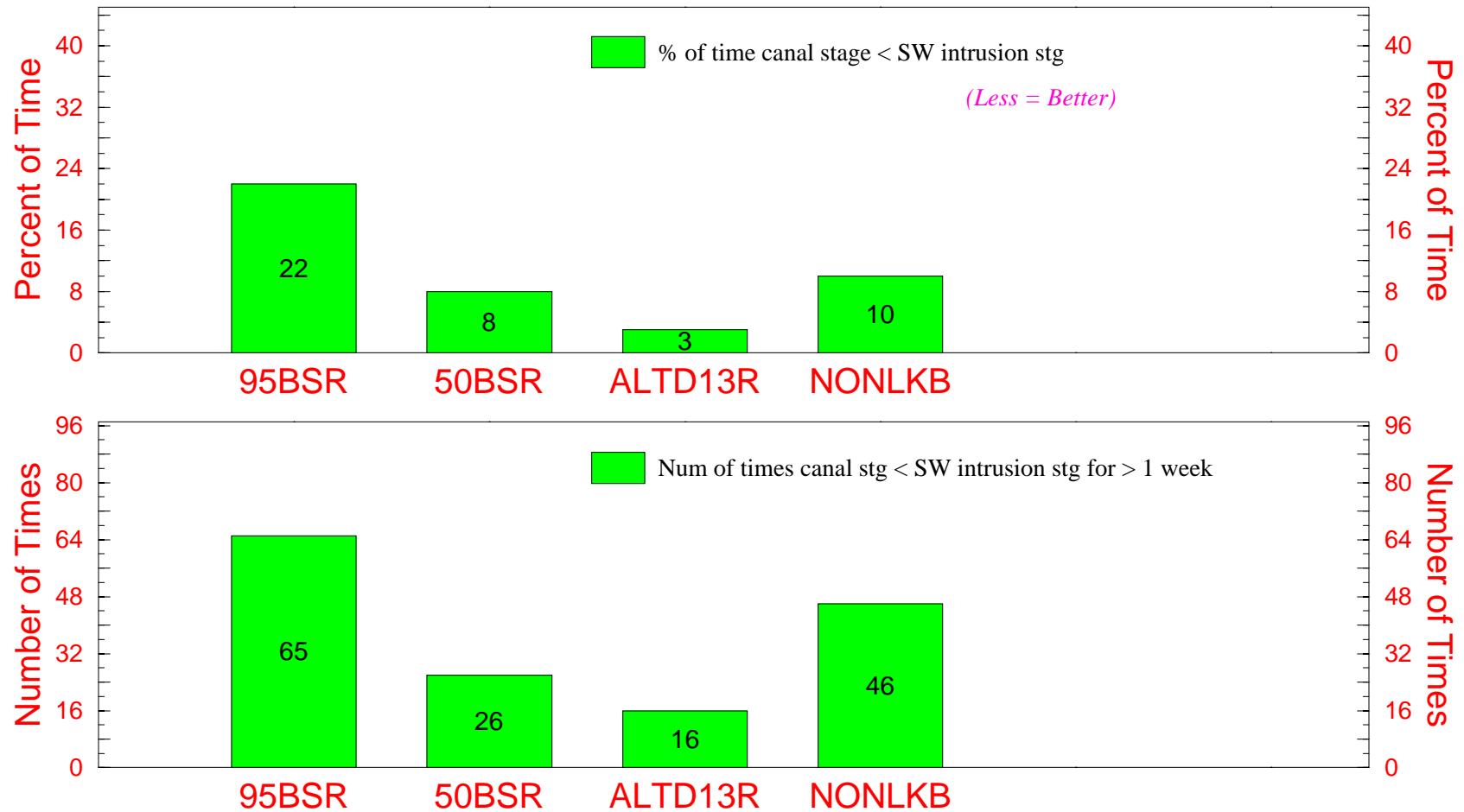


Fig. 8 % of Time Canal Stage < Salt-Water Intrusion Criteria and Occurences > 1 Week  
Canal C-2 at S-22 (Salt-Water Intrusion Indicator Stg = 2.5 ft, NGVD)

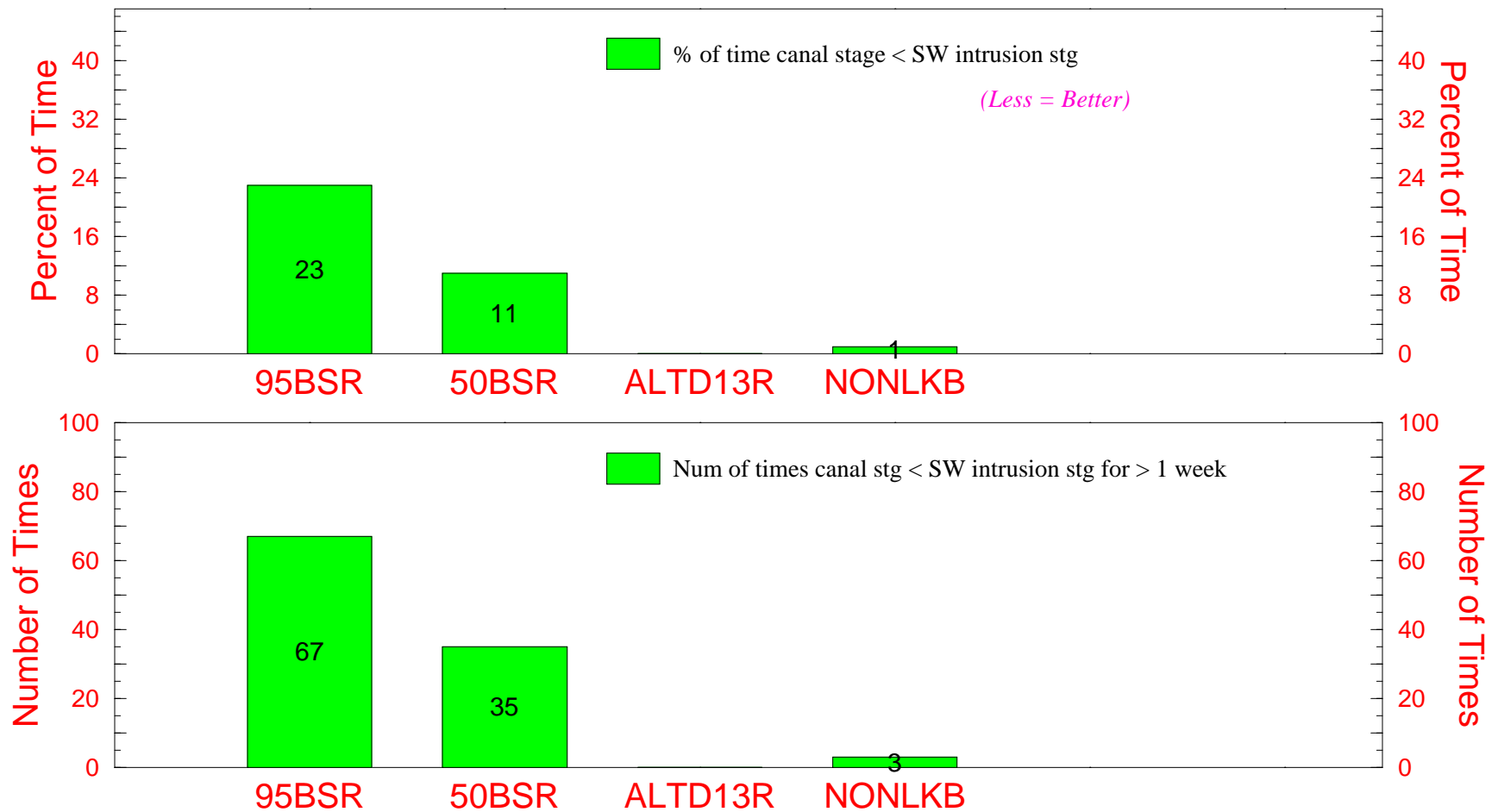
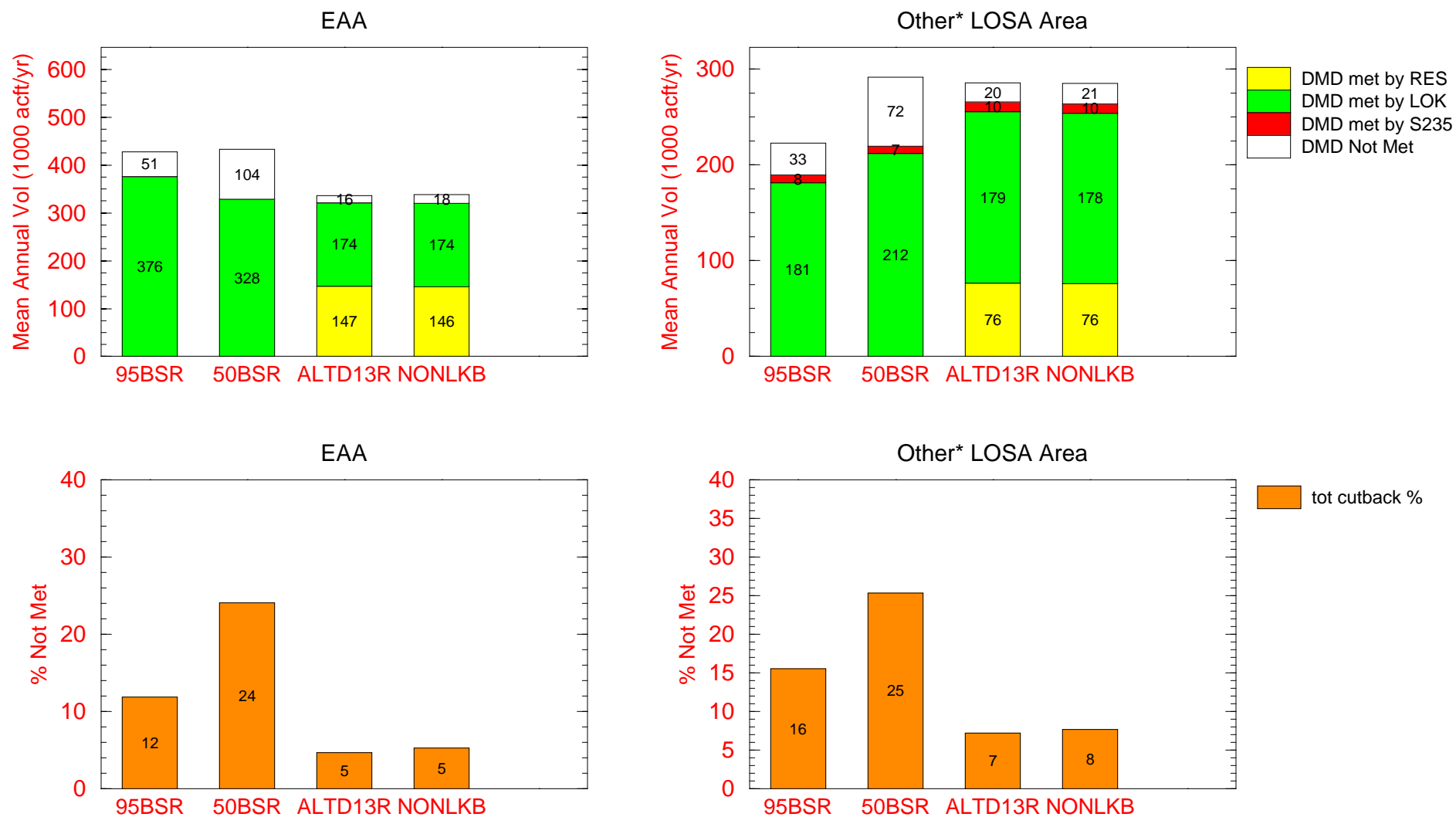
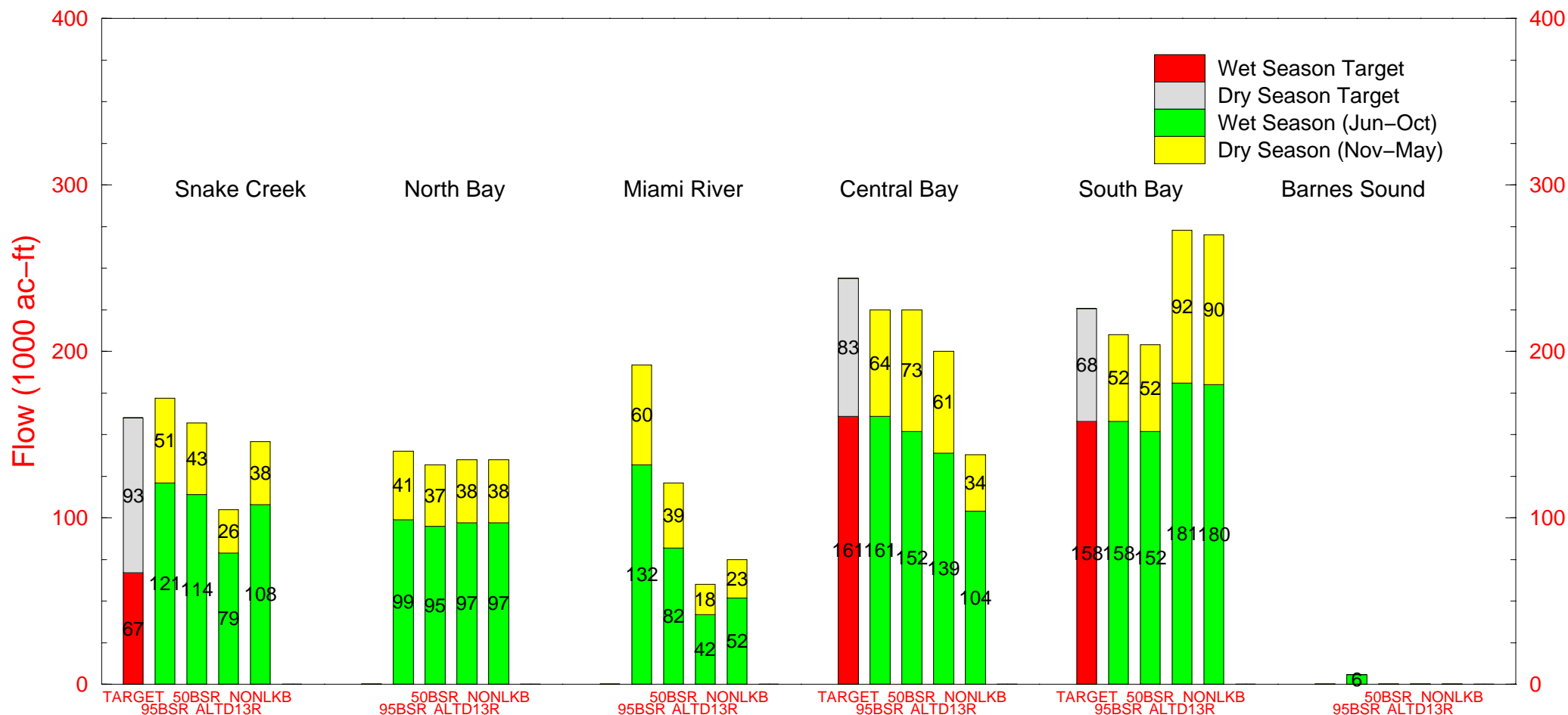


Fig. 9 Mean Annual EAA/LOSA Supplemental Irrigation:  
Demands and Demands Not Met  
for the 1965 – 1995 Simulation Period



\*Other Lake Service SubAreas (S236, S4, L8, C43, C44, and Seminole Indians (Brighton & Big Cypress)).

Fig. 10 Simulated Mean Annual Surface Flows Discharged into Biscayne Bay for the 1965 – 1995 simulation period



Note: Snake Creek=S29; North Bay=G58+S28+S27; Miami River=S26+S25B+S25; Central=G97+S22+S123; South=S21+S21A+S20F+S20G; Barnes Sound=S197

Targets for Central and South Bay reflect a 30% increase in mean annual dry season flows over the 95 Base

Targets for Snake Creek reflect a minimum monthly flow volume of 13,300 ac-ft (x 5 months for wet season

and x 7 months for dry season) to maintain salinity levels below 20 ppt.

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